



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: MEDCALF, CHRISTOPHER)

Application No.: 09/965,190)

Filing Date: 09/27/01)

For: ON SCREEN DISPLAY (OSD))

Art Unit: 2614)

TRANSMITTAL OF PRIORITY DOCUMENT

Director for Patents and Trademarks
Washington, D.C. 20231

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Enclosed herewith is a certified copy of British Patent Application No. 0023998.8
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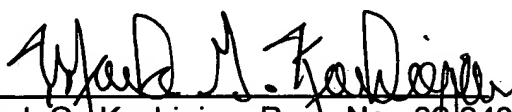
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Respectfully Submitted

HEAD, JOHNSON & KACHIGIAN

Date: 11/02/01

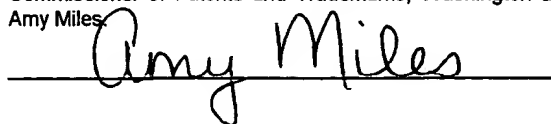
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Cardiff Road
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30 SEP 2000

1. Your reference

GW/MK/G30355

0200T00 E572491-7 D00346

-0023998.8

2. Patent application number

(The Patent Office will fill in this part)

0023998.8

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Pace Micro Technology Plc

Victoria Road
Saltaire
Shipley
BD18 3LF

England

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

6905293001

4. Title of the invention

On Screen Display (OSD)

5. Name of your agent (if you have one)

Bailey Walsh & Co.

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

5, York Place
Leeds
LS1 2SD

Patents ADP number (if you know it)

224001

6. If you are declaring priority from one or more earlier patent applications, give the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

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Priority application number
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Date of filing
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7. If this application is divided or otherwise derived from an earlier UK application, the earlier application

Number of earlier application

Date of filing
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer "Yes" if:

YES

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
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Continuation sheets of this form

Description 6

Claim(s)

Abstract

Drawing(s) 1

10. If you are also filing any of the following, state how many of each item.

Priority Documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (Please specify)

11. I/We request the grant of a patent on the basis of this application

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Date

29th September 2000

12. Name and daytime telephone number of person to contact in the United Kingdom

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On Screen Display (OSD)

The invention relates to the provision and improvement to an On Screen Display on a display screen such as that of a television set.

Certain sequences of OSD operations can cause unwanted visual effects on the screen. Some known sequences of OSD deletion and creation which have been found in certain instances to cause problems include when the deletion of an OSD region occurs followed by the creation of another region. Secondly, a change in position of a region, followed by a drawing operation to that same region can cause problems and thirdly changing the displayed buffer of a region, followed by a drawing operation to the previously displayed buffer of the region, can also cause problems.

In addition to the operations indicated above, other operations may cause other situations which potentially cause unwanted effects, for instance the resizing of a region of the OSD.

Yet further there is the problem of visual artefacts occurring under certain circumstances which include the updating of the OSD linked list, due to the change in time between changing the OSD linked list and the actioning of that change by the processing means such as a decoder of a broadcast data receiver.

In practice the generation of such artefacts are usually avoided by waiting for the generation of a vsync signal to occur on the display screen after any change to the linked list has been made.

However, a problem with waiting for the vsync signal to occur before changing the OSD is that a delay in the desired change of the OSD is caused while awaiting the vsync signal and this can

be irritating to the user and may, in many cases, appear, to the user at least, to be an unnecessary delay.

The aim of the present invention is to provide a method whereby upon changing an OSD, the system can, if necessary await the vsync signal prior to the new display but, if not necessary, need not wait thereby avoiding unnecessary delay.

In a first aspect of the invention there is provided a system for the control of the generation of an on-screen display (OSD) on a display screen, and wherein, upon the deletion, change or movement of an area of the first display control means for the display continue to operate the system until a request to generate, add or otherwise alter the display of the said area is received whereupon the control means detects whether or not a vsync signal for the display screen has occurred since the change to the area of the first display.

In one embodiment if the vsync signal has occurred the generation addition or other alteration with regard to the area of the OSD occurs immediately. If no vsync signal has occurred then the control means delays the new operation until the vsync has occurred.

Typically, if a region of the OSD is deleted, the system can continue in operation until a request to create a new region is made. At that time, if a vsync signal has occurred since the deletion, the creation can take place immediately. If not, the creation must wait until a vertical sync occurs.

In a further embodiment, if the display buffer of a region is changed, the system can continue until a request to draw into the previously displayed buffer of the region is received, at

which point the generation of said second display wait for a vsync signal if one has not occurred since the buffer content was changed.

In a yet further embodiment, if a region of the first display is moved, the system continues until a request to draw into its display buffer is received at which time the processing can continue immediately if a vsync signal has occurred since the movement of the region of the first display, otherwise the drawing command must wait for a vsync signal.

The invention as set out adds intelligence to the system by establishing whether there is and, if possible, eliminating, the need to wait for a vsync signal before generating the second display is actually required. If the delay is not required because the subsequent modification would not in fact cause an artefact then the update and generation of the second display can proceed without delay.

A specific embodiment of the invention is now described with reference to the accompanying Figure

In this example, the control means and system are provided as part of a broadcast data receiver and includes integrated circuit processing chips such as the (ST?)3520 and 5512.

The conventional problem occurs because the devices need to 'look ahead' at the OSD headers, to determine where on the display screen the OSD should be displayed. However the data which is actually to be displayed in the OSD is not read until it is required for the display to be generated.

Typically therefore the system includes a control means with a memory in which OSD definitions in a linked-list are held. A device register is provided which points to the head of the list. In this embodiment, there are two linked-lists, one for each video field, and similarly two registers.

In conventional procedures, when a vertical synchronisation pulse occurs at point A in Figure 1, the device register associated with the field at that location is read, and the header of the OSD region it references is also read. At this time, therefore, it becomes inevitable that the first OSD 2 region will be displayed. If at a slightly later time indicated by point B on Figure 1 a region of the OSD is deleted this will not take effect until the display of this field is complete. However if the second OSD display is generated before the time and location indicated by point C on Figure 1, then the memory freed by deleting the first region will then be reused, and any writes to that memory may be seen on screen in the display of the current field.

In a further conventional example when the displayed buffer of the region is changed the displayed buffer is seen until the next vsync signal and any new data written to the buffer before the generation of the vsync signal time may be seen on screen.

In a yet further conventional example in the case of a moved region, the movement does not take effect until the next vertical sync. Any drawing to the region will be seen at the old position until the next vsync signal.

Thus in accordance with the conventional approach unwanted visual effects are avoided by waiting for a vsync signal after any change is made to the linked-list of OSD headers, including addition or removal of a region or a change in a region's

position and while this prevents the visual effects it slows down operation of the OSD often unnecessarily.

In accordance with the invention, delays can be reduced or eliminated by initially deferring the wait for a vsync signal.

Thus, in the situation set out in the first conventional example given above, in accordance with the invention, if a region is deleted from the first display, the system will continue in operation, without waiting for a vsync signal, and will continue until a request is received to generate the second display. If at the time of the request being received, a vsync has occurred, the control means can proceed to create the second display immediately. If no vsync signal has occurred then the control means will wait until this occurs.

In the situation set out in the second conventional example, in accordance with the invention, if the displayed buffer of a region is changed the control means continues in operation until a request to draw into the previously displayed buffer of the region is received. If at the time of the request a vsync signal has occurred since the change of the buffer the drawing can occur or alternatively the control means must wait until a vsync signal does occur.

In the third situation, in accordance with the invention if a region of the first display is moved the control means will continue until a request is received to draw into the displayed buffer at which time drawings occurs immediately if a vsync signal has occurred since the move or alternatively the control means must wait until the vsync signal is generated.

This solution allows operations that will not cause visual artefacts to be performed without unnecessary waiting, and also smoothes some of the peaks of processor/OSD activity at the time of vertical sync.

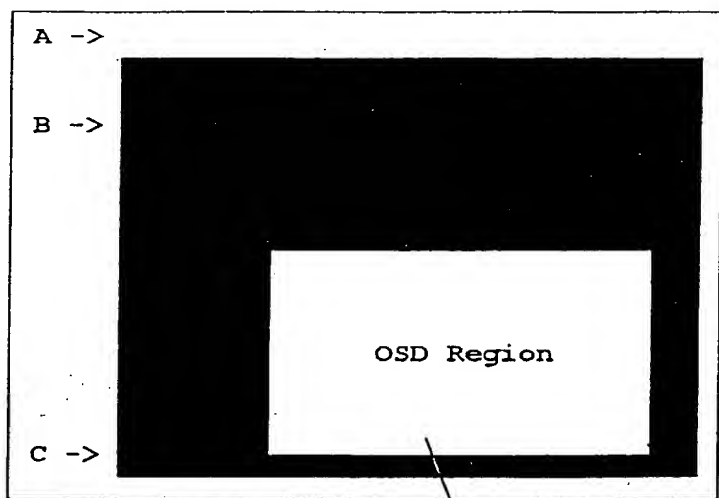


Figure 1